Appendix B

Yearly Radioactive Waste Management Information System Inventory Breakdown from 1984 through 1993

CONTENTS

TABLES

Appendix B

Yearly Radioactive Waste Management Information System Inventory Breakdown from 1984 through 1993

B-1. SUMMARY

This appendix provides supplementary information for the Recent and Projected Data Task (RPDT) (LMITCO 1995) inventory disposals detailed in Section 4 of the main body of this report. The period of interest extends from 1984 through 1993. Yearly pit contaminant disposals developed from the INEEL Radioactive Waste Management Information System (RWMIS) database are presented in Table B-1. Subtotals were independently calculated on Excel spreadsheets not shown in this appendix. Pit disposals were characterized by contact-handled low-activity waste generally containing only small traces of fission products, actinides, and activation products.

Shipment-specific SDA waste-disposal data for each separate shipment for each year were entered into Excel spreadsheets. Net contaminant totals were calculated for each year. Individual shipping RWMIS entries from 1984 through 1993 consisted of hundreds of separate shipments.

Waste streams containing remote-handled activation products represent the dominant source of activity sent to the SDA. The RWMIS inventory data from Table B-1 were used to generate yearly net gross activities for SDA pit disposals shown in Table B-2. Also shown in Table B-2 is a breakdown of each yearly waste stream into its separate components. Most of the waste consisted of general plant waste that was characterized as low-activity shipments consisting of materials from routine plant operations. A much smaller fraction of the disposals consisted of filters or hot cell waste that had higher than average activities.

B-2. COMPARISONS WITH THE CONTAMINANT INFORMATION DATABASE FOR RISK ASSESSMENT

A comparison of the RPDT versus RWMIS inventories is given in Table B-3. Table B-3 exhibits some clear differences in how fission products and actinide waste inventories were recorded. Differences in fission-product inventories are believed to be the consequence of differing isotopic scaling assumptions used in RWMIS and the RPDT report (LMITCO 1995). In the RPDT, gross reported fission-product activities were scaled to assumed average isotopic profiles; therefore, no mixed fission product entry is contained in Table B-3 for the RPDT. Certain nuclides needed for the SDA risk assessment (see Section 1 of this report) are not recorded in Table B-3. For instance, Tc-99 is a long half-lived beta emitter and was not factored into either column in Table B-3. One of the reasons for these omissions was the consequence of different regulatory and reporting constraints at the time these inventories were developed.

Table B-1. Summary of RWMIS SDA pit disposal contaminant inventories from 1984 through 1993.

Nuclide	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Total
Co-60	—	—	—	1.9E-01	—	—	—	—	1.3E-04	—	1.9E-01
Sr-90	8.1E+00	9.0E+00	1.8E+01	1.6E+01	1.8E+01	8.1E+00	2.1E+01	2.4E+00	2.1E-01	7.2E-03	1.0E+02
Cs-137	2.7E+01	9.7E+00	1.8E+01	4.3E+01	1.8E+01	8.1E+00	2.1E+01	2.4E+00	2.1E-01	7.2E-03	1.5E+02
Eu-152	—	—	—	6.5E+00	—	—	—	—	—	—	6.5E+00
Eu-154	—	—	—	4.6E+00	—	—	—	—	5.0E-06	—	4.6E+00
Mixed fission products	2.7E+01	1.5E+01	3.3E+01	3.3E+01	1.5E+01	1.3E+01	—	—	—	—	1.4E+02

Table B-2. Yearly total and separate stream activities for shipments from INTEC to the SDA soil vaults and pits.

Year	Total Activity (Ci)	Filter Waste Activity (Ci)	Hot Cell Waste Activity (Ci)	General Plant Waste Activity (Ci)
1984	3.0E+02	2.0E+02	7.6E+00	9.8E+01
1985	1.1E+02	3.1E-01	8.6E+00	1.0E+02
1986	2.1E+02	1.9E+01	1.3E+02	5.6E+01
1987	2.2E+02	0.0E+00	3.0E+01	1.9E+02
1988	1.9E+02	6.2E+01	0.0E+00	1.3E+02
1989	9.5E+01	0.0E+00	0.0E+00	9.5E+01
1990	2.1E+02	0.0E+00	0.0E+00	2.1E+02
1991	2.4E+01	0.0E+00	0.0E+00	2.4E+01
1992	2.1E+00	0.0E+00	0.0E+00	2.1E+00
1993	7.2E-02	0.0E+00	0.0E+00	7.2E-02
Totals	1.4E+03	2.8E+02	1.8E+02	9.1E+02

Table B-3. Comparison of RWMIS fission products and actinide waste inventories versus RPDT for 1984 through 1993.

Nuclide	Total RWMIS Activities (Ci)	Total RPDT[a] Activities (Ci)
Co-60	1.9E-01	1.0E-01
Sr-90	1.0E+02	8.7E+01
Cs-137	1.5E+02	9.9E+01
Eu-152	6.5E+00	3.1E+00
Eu-154	4.6E+00	2.2E+00
MFP	1.4E+02	—
Total	4.0E+02	1.9E+02

a. LMITCO (1995).

B-3. CONTAMINANT INVENTORIES FOR THE RECENT AND PROJECTED DATA TASK

As noted in Table B-3, certain nuclides were not reported in either the RPDT or RWMIS for the period of interest. To estimate net activities for these nuclides, standardized specific activity scaling factors were uniformly applied to all waste shipments containing fission product contaminants. Specific activities and corresponding scaling factors were based on averaged calcine activity distributions as documented in Appendix E. Calcine was judged to have the most representative generic isotopic distribution for disposals during the RPDT period. The corresponding contaminant profiles for the period of interest are shown in Table B-4. The estimated activities in Table B-4 are based on an equivalent Cs-137 activity of 1.8E+02 Ci. That is, a total baseline Cs-137 activity of 1.8E+02 Ci was disposed of from 1984 through 1993.

The net Cs-137 was set equal to the reported cesium activity from the pit disposals plus an assumed equivalent Cs-137 activity set equal to 0.25 of the net mixed fission product activity. For these SDA disposals, the corresponding Cs-137 activities then became equal to 1.8E+02 Ci (See Table B-1). The resultant best estimate activities were somewhat larger than the handful of reported RPDT best-estimate activities shown in Table B-4.

Table B-4. INTEC bounding contaminant activity estimates from 1984 through 1993.

Nuclide	Lower Bound (Ci)	Best Estimate (Ci)	Upper Bound (Ci)	RPDT[a] Activities (Ci)
H-3	3.5E-01	5.2E-01	7.8E-01	—
Be-10	4.6E-09	6.9E-09	1.0E-08	—
C-14	1.9E-07	2.9E-07	4.4E-07	—
Cl-36	0.0E+00	0.0E+00	0.0E+00	—
Co- 60	1.5E-01	2.3E-01	3.4E-01	1.0E-01
Ni-59	4.1E-04	6.1E-04	9.1E-04	—
Ni-63	2.8E-02	4.1E-02	6.2E-02	—
Sr-90	1.2E+02	1.8E+02	2.8E+02	8.7E+01
Nb-94	3.7E-08	5.6E-08	8.4E-08	—
Tc-99	2.4E-02	3.6E-02	5.4E-02	—
I-129	3.9E-05	5.8E-05	8.7E-05	—
Cs-137	1.2E+02	1.8E+02	2.7E+02	9.9E+01
Eu-152	8.6E-03	1.3E-02	1.9E-02	3.1E+00
Eu-154	1.6E+00	2.4E+00	3.5E+00	2.2E+00
Pb-210	3.2E-10	4.7E-10	7.1E-10	—
Ra-226	4.5E-08	6.7E-08	1.0E-07	—
Ra-228	6.8E-12	1.0E-11	1.5E-11	—
Ac-227	1.2E-08	1.7E-08	2.6E-08	—
Th-228	2.1E-03	3.1E-03	4.7E-03	—
Th-229	9.6E-11	1.4E-10	2.2E-10	—
Th-230	1.7E-07	2.5E-07	3.8E-07	—
Th-232	3.1E-13	4.7E-13	7.1E-13	—
Pa-231	3.1E-08	4.6E-08	6.9E-08	—
U-232	4.2E-06	6.3E-06	9.5E-06	—
U-233	6.0E-09	9.0E-09	1.4E-08	—
U-234	4.3E-04	6.4E-04	9.6E-04	—
U-235	2.8E-06	4.2E-06	6.2E-06	—
U-236	6.9E-06	1.0E-05	1.6E-05	—
U-238	1.4E-07	2.2E-07	3.2E-07	—
Np-237	4.2E-05	6.2E-05	9.4E-05	—

Table B-4. (continued).

Nuclide	Lower Bound (Ci)	Best Estimate (Ci)	Upper Bound (Ci)	RPDT[a] Activities (Ci)
Pu-238	5.1E-01	7.6E-01	1.1E+00	—
Pu-239	8.3E-03	1.2E-02	1.9E-02	—
Pu-240	6.5E-03	9.7E-03	1.5E-02	—
Pu-241	7.4E-01	1.1E+00	1.7E+00	—
Pu-242	1.3E-05	2.0E-05	3.0E-05	—
Pu-244	2.0E-13	3.1E-13	4.6E-13	—
Am-241	3.6E-02	5.4E-02	8.1E-02	—
Am-243	3.4E-04	5.1E-04	7.6E-04	—
Cm-243	1.1E-05	1.6E-05	2.4E-05	—
Cm-244	6.6E-04	9.9E-04	1.5E-03	—
Cm-245	6.0E-08	9.0E-08	1.3E-07	—
Cm-246	4.7E-09	7.1E-09	1.1E-08	—
Cm-247	6.1E-15	9.2E-15	1.4E-14	—
Cm-248	7.4E-15	1.1E-14	1.7E-14	—

a. LMITCO (1995).

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